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ABSTRACT

This study examined the professional self-perceptions and self-esteem of Hong Kong student teachers, investigating the impact of teaching practice. Participants were student teachers in their first or third year of full-time, 3-year courses at 1 of the 4 colleges of education in Hong Kong. A total of 424 student teachers completed a questionnaire before and after student teaching. The questionnaire measured self-esteem as a teacher, focusing on self-esteem, teacher-student relationships, teacher efficacy, teacher commitment, humanism, adequacy of teaching abilities, and classroom techniques. Data analysis indicated that student teachers' personal and professional self-esteem differed from each other as they were subject to different influences. The development of their professional self-esteem depended on the manner in which they perceived their teaching efficacy, teacher student relationships, and commitment to teaching. Student teachers' humanistic beliefs and perceptions of the adequacy of teaching skills overwhelmingly influenced the organization of self-structure. Except for their self-perceived adequacy of teaching abilities, the impact of the other teaching practice experiences on the development of self-esteem was fairly limited. (Contains 70 references.) (SM)

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The Impact of Teaching Practice on Professional Self-Esteem: A covariance analysis

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A recursive model, as proposed in this study, supported the hierarchical organisation of self-esteem and a number of self-perceptions of a sample of Hong Kong student teachers. General self-esteem was at the apex and professional self-esteem the second level of the hierarchy. In turn, the professional self-esteem was mainly subject to the influence of a cluster of professional self-conceptions - teaching efficacy, teacher-pupil relationships and teaching commitment. The student teachers' humanistic beliefs and perceptions of student teaching abilities significantly influenced the structuring of the self-conceptions. Other selected teaching practice variables, such as class discipline and management, pupil learning achievement, academic standard of pupils, usefulness of writing lesson plans for teaching, and evaluation of teaching practice performance by methodology supervisors, posed a rather weak effect on the organisation of the professional self-structure.

Introduction

Teaching practice can be a rewarding moment of teacher training or a time of disillusionment. During such practice, the novices receive guidance and evaluations from

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[1] This paper reports part of the findings of Ph. D. research conducted by the first author under the supervision of the second. Requests for reprints should be sent to Dr. Ka Wah Yeung, Rm. 47, 1/F., D2, EMPS, The Hong Kong Institute of Education, Lo Ping Road, Tai Po, New Territories, Hong Kong. This research is sponsored by a research grant offered by the Hong Kong Institute of Education.

various sources, such as college lecturers, teaching practice supervisors, cooperating teachers, and the school. Moreover, they engage quite a considerable amount of time on their own in interactions with school children and are expected to develop autonomous professional judgements. By reflecting on what has been learnt from these experiences of guidance and evaluation, teaching and pupil encounters, they come to understand better the real demands of teaching and their own suitability to satisfy the demands. Teaching practice thus shapes the trainees' beliefs and attitudes, which in turn influence their career judgements as well as decision-making and actions in the classroom. This research mainly examines the structural relationships of student teachers' professional self-esteem with a number of other self-constructs as well as the effects of teaching practice on the development of the self-structure. Such research is rare in any context, let alone the non-western one of Hong Kong, which forms the backdrop of this study.

The nature of self-concept

The self is represented as a structure of schemata in memory (Markus & Sentis, 1982). This idea of cognitive generalisations about the self implies that self-schemata will result in an individual with a consistent pattern of judgements, decisions, and actions (Markus, 1977). Self-concept, represented as a self-schema, refers to feelings, thoughts, and attitudes about oneself (Burns, 1982; Byrne, 1984; Fleming & Courtney, 1984), and hence it broadly subsumes self-descriptions (self-image) and self-evaluations (self-esteem). Among the theoretical models that have been developed, it is the hierarchical, multifaceted model proposed by Shavelson, Hubner and Stanton (1976) that has received the greatest empirical support (e.g. Byrne & Shavelson, 1996; Hattie, 1992; Marsh, Byrne & Shavelson, 1988). This model, which suggests that self-concept is structured with general self-concept at the apex of

the hierarchy and more specific self-concepts at the base, has been the basis of a number of measuring instruments with strong psychometric properties for school and college students in both western (Hattie, 1992; Marsh, 1988), and non-western countries (Cheng, 1997; Watkins, Fleming & Alfon, 1989). In the Hong Kong context, this model has been modified and extended to be appropriate for Chinese adults with and without physical disability (Tam & Watkins, 1995).

Student teachers' professional self-concept

Student teachers' self-conceptions and professional self-concept as a teacher have predominantly been measured by semantic differential scales (Coulter, 1974; Coulter & Elsworth, 1976/77; Gregory, 1976; Gregory & Allen, 1978; Walberg, Metzner, Todd & Henry, 1968; Wright & Tuska, 1966) and the Tennessee Self-Concept Scale (Garvey, 1970; Scherer, 1979; Smith & Smith, 1979). With respect to the former measures, a list or clusters of adjectives, which at the same time were applied to measure the self as a person, assessed the professional self-concept. The underlying model of self is unclear. The Tennessee Self-Concept Scale (Fitts, 1965) was meant to measure the self-concept of adults and young persons. Again its underlying model of self is unclear and it has not made use of improvements in conceptualising and measuring the self-concept.

The self-concept literature has shown the importance of assessing specific aspects of the self-concept rather than general self-concept if behaviour in specific area is to be explained (Byrne & Shavelson, 1996; Hattie, 1992). Recent hierarchical models have been proposed and received empirical support to the underlying facets of the self, such as academic self-concept, physical self-concept and social self-concept (Byrne & Shavelson, 1986, 1987, 1996; Fleming

& Courtney, 1984; Marsh, 1988; Marsh & O'Neill, 1984). A very important pre-requisite of this research was to develop a model of professional self-esteem, following the rationale of hierarchical features of the self, and an appropriate instrument for self-concept as a teacher. Hence, we may argue that any attempt to measure the professional self-concept should adequately reflect pedagogical experiences of student teachers. Also research in student teacher self-concept should pay attention to measurement reliability and validity of their measures as a pre-requisite requirement.

Student teachers' teaching efficacy, pupil control and humanism

There are a number of domain-specific self-attitudes and beliefs that are closely associated with professional self-esteem. Amongst these is a sense of teacher efficacy that is often considered as one of the measures for assessing teacher effectiveness. Conceptually, we may suggest that self-concept and self-efficacy are two independent psychological constructs. Self-concept can be distinguished from self-efficacy in the way that its structure is organised on the basis of all sorts of life events rather than on the sole influence of capabilities as what self-efficacy is mainly subject to. Nonetheless, the two constructs should be mutually related. A change in self-concept may affect the change in self-efficacy, or vice versa. Following the above distinction, we may further argue that teacher efficacy should be a component of self-efficacy and thus it is a narrower and more focused concept than self-efficacy in relation to self-concept.

A few studies have investigated the extent to which the sense of efficacy of student teachers is related to their pupil control ideology and teaching commitment. The study of Hoy and Woolfolk (1990) indicated that a sample of student teachers became more custodial, their

sense of personal teaching efficacy increased, but their general sense of teaching efficacy declined after teaching practice. The authors suggested that the increase in confidence of teaching ability of the student teachers came in part from learning to maintain class order, though many of the teachers realised that they were not effective in bringing about change in learning outcomes. In another research, Woolfolk and Hoy (1990) showed that the perceptions of pupil control of a group of student teachers had a significant negative correlation with their teaching efficacy, but were not significantly correlated with their personal teaching efficacy. Hence, it was inferred that those student teachers that were more humanistic tended to believe that they were able to overcome pupils' home and background factors in order to bring about learning.

Some research has focused on examining the relationship of school teachers' sense of efficacy with such variables as pupil control ideology, classroom climate, teaching commitment, teacher competency and pupil learning. The findings of Barfield and Burlingame (1974) indicated that teachers within the low efficacy group tended to be more custodial than those in average or high efficacy group. The studies of Ashton (1984) and Ashton, Webb, and Doda (1983) found that the sense of efficacy of a sample of teachers was positively related to their maintenance of a warm, accepting classroom climate, but negatively to harsh control tactics. High efficacy teachers were positive about themselves, teaching, and their pupils. The work of Trentham, Silvern, and Brogdon (1985) indicated that the sense of efficacy of a sample of teachers was related to teacher competency as rated by superintendents. Anderson, Greene, and Loewen (1988) found that the personal efficacy of the grade 3 teachers at the beginning of the year was significantly correlated with pupils' achievement, but the teaching efficacy and the end of year personal efficacy of the grade 3 teachers as well as the efficacy dimensions of the grade 6 teachers were not significantly correlated with pupils' achievement.

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It is important to note that the Pupil Control Ideology (PCI) Form (Willower et al., 1967), as reported in those studies mentioned earlier, is more biased towards custodialism and humanism. So the items for measuring the ingredients of humanism, such as acceptance and empathy, should be increased in order to secure a balanced, salient feature of humanism against the more focused custodial quality of the PCI scale (Yeung, 1997). Despite the lack of a clear distinction between custodialism and humanism in studies adopting the PCI scale, there are indications showing that humanistically oriented teacher trainees, in contrast to those who were authoritarian, tended to be emotionally stable, expedient, happy-go-lucky, imaginative, venturesome, outgoing, relaxed and self-assured (Halpin, Halpin & Harris, 1982), and that a significant relationship existed between student teachers' job satisfaction in teaching and their attitudes towards acceptance of self and others (Crane, 1974).

Roles of cooperating teachers and supervisors

Cooperating teachers are in general significant for the professional development of student teachers (Blair, David & Bacharach, 1984; Funk, Long, Keithley & Hoffman, 1982; Karmos & Jacko, 1977). However during student teaching, student teachers not only encounter conflicting roles and demands between cooperating teachers and visiting lecturers, but also conflicting educational orientations and practice between their college/ university training and placement school (Cooper, 1995; Turney, 1987). There exist similarities and differences in the conception of professional knowledge between student teachers and their supervisors (Kremer-Hayon, 1989). In general, the cooperating teacher is expected to concentrate on providing practical help and advice, whereas the visiting lecturer has the potential to diagnose teaching systematically and encourage innovation. Moreover, they have

different frames of reference about what constitutes effective teaching (Turney, 1987). The findings of Ben-Peretz and Rumney (1991) indicated that cooperating teachers and university/ college tutors differed in professional thinking and modes of interaction during the post lesson conferences with student teachers held in the process of guided practice. Nonetheless, in the study of Morrow and Lane (1983), there was a high level of agreement on problem areas and levels of difficulty for instructional problems between student teachers and supervising teachers. College supervisors also perceived similar student teaching problem areas, but differed significantly with student teachers and supervising teachers in the difficult levels of instructional problems.

As far as the supervision of visiting tutors is concerned, student teachers may come across conflicting demands in the role of the supervisor as well as among supervisors. There may be conflicts in the role of the supervisor in such instances as between advisory role and assessment role, and between school expectations and up-to-date teaching methods (Katz, 1986). The results of Duffy (1987) suggested that student teachers encountered different expectations among tutors (education and specialist) as well as inconsistent assessment criteria employed by the tutors with respect to the students' teaching performance on school based teaching practice.

Some critics of teacher education have suggested that college lecturers are not suitable for playing the role in the practicum supervision of student teachers (Mansfield, 1986; McIntyre, 1984; Meade, 1991). Meade (1991) suggested that college faculty members should be confined to help train and to serve clinical teachers rather than to supervise interns. The study of Mansfield (1986) showed that the supervisors appeared ill-equipped for the development of student teachers' teaching knowledge and skills, and experienced difficulty

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making effective and constructive criticisms. Little attempt was made by the supervisors to integrate theory and practice in supervision. There were indications in the study of Hoste (1982) which suggested that the school-practice supervisory tutors contributed significantly only to the student teachers' evaluation of their own work but not to preparation for the practice and the task of teaching. The evidence from the studies of supervision practice (Proctor, 1993) indicated that the supervision practised by the tutors was mainly based on their own perceptions of the nature of effective teaching which were inadequate in promoting reflective practice and professional experience of student teachers.

Aims of the research

The purpose of this research is

(1) to test a causal model linking perceptions of teaching practice on post-practice self-esteem in order to determine which aspects of the teaching practice experience would be most salient for self-concept as a teacher;

(2) to differentiate the effects of teaching practice on general and professional self-esteem; and

(3) to examine the structure of self-dimensions that underlies professional self-esteem.

Methodology

The sample

The sample of this research consisted of student teachers who were in their first or third year of the full-time three-year courses during the academic year (1993-94) at one of the four colleges of education in Hong Kong: the Sir Robert Black College of Education (SRBCE), the Grantham College of Education (GCE), the Northcote College of Education (NCE), and Hong Kong Technical Teachers' College (TTC). Out of the 591 and 482 student

teachers, who respectively participated in the pre-test before the teaching practice and the post-test after the teaching practice for the administration of the "My Teaching Self" questionnaire, 424 completed both tests. The proportion of the first year to the third year participants was about 1.5 to 1.0, while the ratio of female to male students was about 3.3 to1 in both tests. When the students were engaged in practical teaching, methodology and elective supervisors, who provided guidance as well as evaluation of their teaching performance, visited them. In general, the cooperating teachers offered limited guidance for the student teachers as they did not possess any mandatory obligations to the students.

The instrument

The "My Teaching Self" questionnaire was developed to measure self-esteem-as-a-teacher for teacher education students in Hong Kong (see Yeung, 1997). It involves eight scales: Rosenberg's Self-Esteem (RSC), Global Professional Self-Esteem (GPS), Teacher-Pupil Relationships (TPRS), Teaching Efficacy (TES), Teaching Commitment (CTS), Humanism (HUS), Adequacy of Teaching Abilities (TABILITY) and Class Discipline and Management (CLASSMAN). In this research, the internal consistency reliability of responses to these scales were very adequate, with Alpha coefficients ranging from .72 to .90 and corrected item-total correlations all exceeding .20. Confirmatory factor analysis also supported the proposed factor structure of responses to this instrument.

Methods of parameter estimation

Since data for the observed variables of the structural models to be evaluated were a combination of ordinal and continuous measures, the matrix of polychoric and polyserial correlations together with its inverted asymptotic covariance matrix, as recommended by PRELIS 2 program (Jöreskog & Sörbom, 1993a), were used for analysis. And the generally

weighted least squares method (WLS), which is asymptotically distribution free, should be adopted for the estimation of parameters (LISREL 8, Jöreskog & Sörbom, 1993b & 1993c). However, initial analysis revealed that the sample correlation matrix was not positive definite, a condition which precluded analysis based on the WLS method. Most probably, the non-positive definiteness was due to collinearity problems among the observed variables (Wothke, 1993). Even though a ridge was added in the process of LISREL analysis, the problem could not be solved. An alternative approach adopted here was to use the unweighted least squares (ULS) method, which does not require a positive definite sample covariance (correlation) matrix for parameter estimations (Wothke, 1993). ULS is a consistent estimator and is without the assumption that observables have a particular distribution. However, it is not asymptotically efficient (Bollen, 1989). Standard errors for ULS are estimated under normal theory (LISREL 8, Jöreskog & Sörbom, 1993b).

As some of the continuous observed variables were not normally distributed (Yeung, 1997), an attempt was made to normalise the data by means of the power transformation function of PRELIS 2 program (Jöreskog & Sörbom, 1993a). However, even though the distribution of the continuous observables was much transformed towards univariate normality, especially in respect of the state of skewness, multivariate normality could not be attained. Hence, estimations by ULS were based on the original data of the observables. Caution has to be taken concerning the interpretations of significance testing of parameters. It is noteworthy that all parameters to be reported, except for significance testing of parameters, were obtained from the fully standardised solutions of LISREL outputs, i.e. both observables and latent variables are standardised.

Rationale for the covariance structural equation modelling

Data were collected through the "My Teaching Self" questionnaire at two points of time under a quasi-experimental design: once before the teaching practice took place and another time immediately after the practice ended (Yeung, 1997). Over about one month, and one and a half months of teaching practice of the first year and third year student teachers respectively, as a whole the professional self-perceptions of the students, including personal self-esteem, professional self-esteem, teaching efficacy, teacher-pupil relationships, and teaching commitment, became more positive. All these provided indications that the student teachers in general likely found that the teaching practice was a positive experience (Yeung, 1997).

Structural equation modelling, which is now recognised as a major advance over previous statistical techniques such as multiple regression or path analysis, was utilised to analyse variables influencing changes in self-conceptions after teaching practice (Asher, 1983; Bollen, 1989; Hoyle, 1995; James, Mulaik & Brett, 1982). Only 12 variables were selected for the purpose of causal model specification subsequent to a preliminary regression analysis, and taking into account minimisation of the effects of collinearity and the sample size limitation set by the LISREL analysis. The endogenous variables after teaching practice included: Rosenberg's Self-Esteem (RSC2)- a person's overall self-worth; Global Professional Self-Esteem (GPS2)- the student teachers' overall feelings and evaluations about their suitability and worth as a teacher; Teaching Efficacy (TES2)- the student teachers' belief in their adequacy of teaching skills and knowledge for dealing with classroom learning and in their capability of bringing about learning in pupils, which represented the incorporation of the rationale of the Personal Teaching Efficacy and Teaching Efficacy of Gibson and Dembo

(1984) according the construct validity results of Yeung (1997); Teacher-Pupil Relationships (TPRS2)- the student teachers' overall evaluations about the extent they believed they had good relationships with pupils; and Teaching Commitment (CTS)- the student teachers' sense of concern and responsibility for teaching. On the other hand, the exogenous variables consisted of: Humanism (HUS2)- the student teachers' beliefs related to their empathetic understanding, respect, acceptance of individual differences and trust in pupils; Adequacy of Student Teaching Abilities (TABILITY)- the student teachers' self-perceived adequacy of pedagogical knowledge and skills; Class Discipline and Management (CLASSMAN)- the extent the student teachers felt that they had been capable of maintaining class discipline and that their pupils had found their teaching interesting and respected them, and had been co-operative in learning; Pupil Learning Achievement (PUPACH)- the student teachers' evaluation of their pupils' achievement in learning; Pupil Academic Standard (PUPSTAND)- the student teachers' evaluation of their pupils' academic standard; Satisfaction of Teaching Performance as evaluated by Methodology Supervisors (METHEVAL); and Usefulness of Writing Lesson Plans for Teaching (PLANS).

It should be noted that the previously mentioned endogenous and exogenous variables were referred to as direct measures (original scales). In this covariance structural modelling, they were distinguished as latent variables. The endogenous variables RSC2, GPS2, TES2, TPRS2 and CTS2, and the exogenous variables HUS2, TABILITY and CLASSMAN were to be regressed on by two manifest (observed) variables, each of which was derived from the sum of randomly selected half of the items constituting their respective scale. For each pair of observed variables, one of them was assigned as a reference variable whereas the other is a free parameter for estimation. Each of the remaining exogenous latent variables PUPACH,

PUPSTAND, PLANS, and METHEVAL was related to a corresponding manifest ordinal variable.

The first model to be scrutinised was a recursive one. It is shown in simple form in Figure 1, which shows the possible levels of causal relationships among the latent variables. Following the rationale of Shavelson et al.'s (1976) hierarchical model, general self-esteem (RSC2) would be considered to be the most inclusive among the endogenous variables since it was concerned with the overall personal sense of worth.

Professional self-esteem (GPS2), as suggested by self theories (Markus, 1977; Wiley & Alexander, 1987), should be more situationally sensitive to the effects of professional perceptions of student teachers than RSC2 even though there is evidence indicating that a general self-concept measure is related to such variables as social relationships and performance/ competency in general self-concept research (Byrne, 1984; Harter, 1986) and teaching performance/ competency in student teacher research (Doherty, 1980; Garvey, 1970; Scherer, 1979). It could be argued that social relationships and competency would pose an indirect effect on RSC2 through GPS2 in the context of student teaching development. Hence inferring from this argument, GPS2 could be considered deriving direct effects from the sense of teaching efficacy (TES2) and the perceptions of teacher-pupil relationships (TPRS2). Moreover, it was predicted that teaching commitment (CTS2) of student teachers should also contribute to their development of professional self-esteem (GPS2) since responsibility implies a sense of self-worth.

The development of the sense of teaching efficacy (TES2) of student teachers would be likely to be subject to a wide range of factors. Studies have shown that student teachers'

sense of efficacy, measured by the Teacher Efficacy Scale (Gibson & Dembo, 1984), was related to their capability of maintaining class order (Hoy & Woolfolk, 1990), custodial/ humanistic beliefs (Woolfolk & Hoy, 1990), and teaching commitment (Evans & Tribble, 1986). Evidence from studies with teachers indicated that teacher efficacy had relationships to maintenance of a warm, accepting classroom climate, a sense of personal accomplishment, positive expectations for pupil behaviour and achievement, a sense of control of pupil learning, strategies of achieving objectives, and a sense of common teacher-student goal (Ashton, 1984; Ashton, Webb & Doda, 1983).

On the other hand, if the development of student teachers' sense of efficacy were contingent upon the extent to which the novices gained successful teaching experiences during student teaching, a source of research concerning student teachers' perceptions of teaching success would provide implications for the possible factors responsible for the development. Those factors might include lesson planning and preparation, behaviour and instructional management, pupil participation and involvement in learning, knowledge of subject matters and teaching methodology, and the respect of pupils towards the teacher (Borko, Lalik & Tomchin, 1987; Ellwein, Graue & Comfort, 1990; Galluzzo & Kacer, 1991; Hill, Lee & Lofton, 1991). However, it should be noted that the above research results were mainly obtained from correlational studies.

For this research, it was predicted that perceptions relating teacher-pupil relationships (TPRS2), adequacy of teaching abilities (TABILITY), classroom management abilities (CLASSMAN), pupil learning achievement (PUPACH), pupil academic standard (PUPSTAND), and usefulness of writing lesson plans (PLANS) would exert direct effects on teaching efficacy (TES2). And HUS2 would influence TES2 indirectly through TPRS2.

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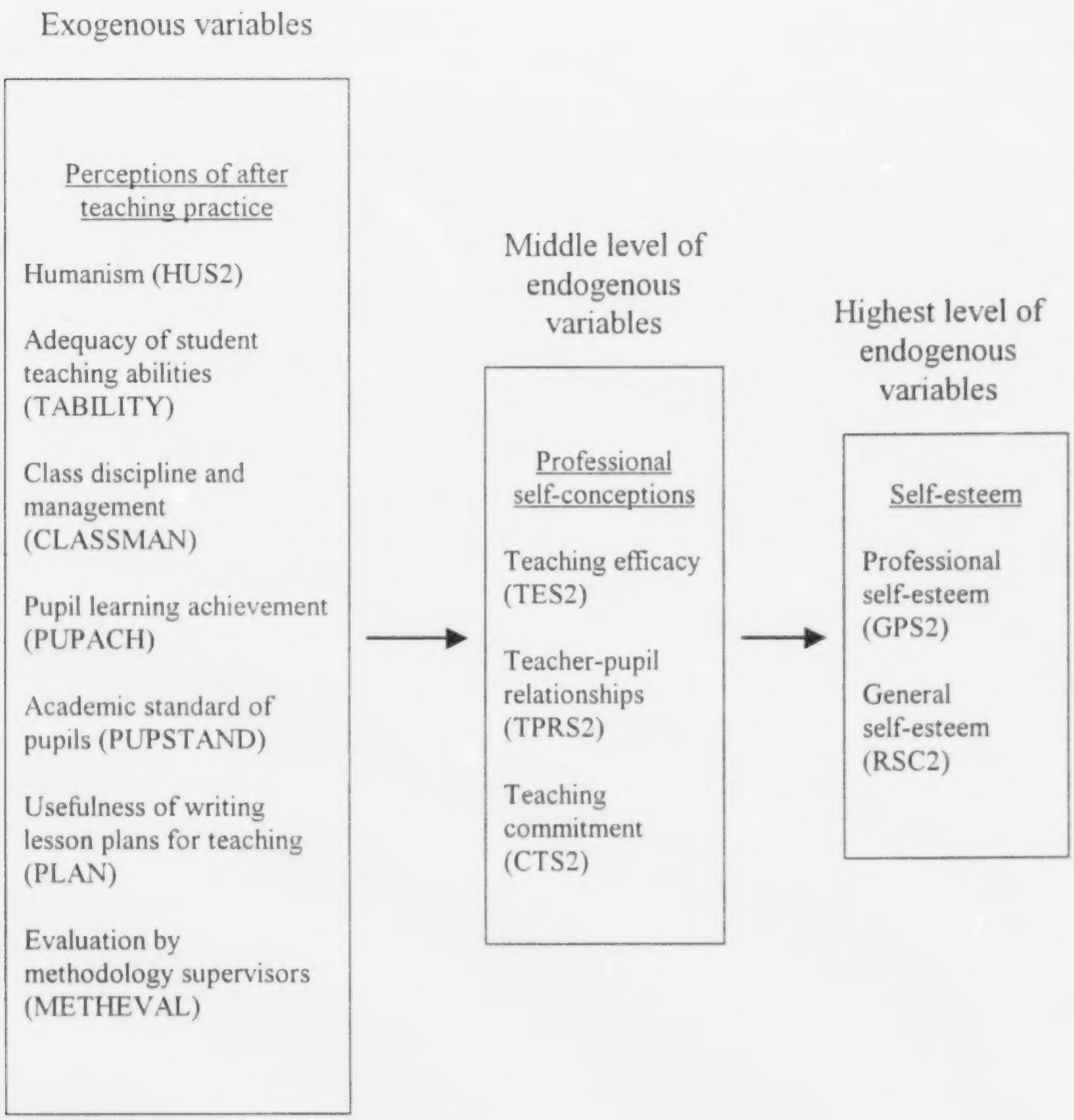
Finally, it would reasonably be assumed that the evaluation of student teachers' teaching performance given by methodology supervisors (METHEVAL) should play a role in affecting the development of TES2.

Presumably, both student teachers' attitudes of being committed to teaching (CTS2) and humanism (HUS2) might work in a manner that was likely to affect the way they saw their teacher-pupil relationships (TPRS2). The extent that classroom discipline and management (CLASSMAN) could be maintained by student teachers during teaching practice would lay down a foundation for developing the perceptions about their relationships with pupils.

There were four factors that could be considered responsible for influencing the development of student teachers' sense of commitment to teaching (CTS2). Humanistic attitudes would entail a strong sense of responsibility, which would contribute to the sense of commitment. The management of classroom discipline and learning (CLASSMAN), pupils' learning achievement (PUPACH) and pupils' academic standard (PUPSTAND) would be expected to affect student teachers' work earnestness, thus their teaching commitment.

Figure 1 A hypothetical model: The effects of teaching practice experience on the development of student teachers' self-constructs



Besides the above hypothetical model, a reciprocal relationship might occur between RSC2 and GPS2, suggesting the possibility of a non-recursive model. The rationale was that self-esteem of student teachers (RSC2), on the basis as individuals', would operate at the same time to bring about its effects on the novices' development of professional self-esteem (GPS2). The remaining causal specifications among the endogenous and exogenous variables were similar to those of the recursive model.

Despite the pre-planned model specifications for the matrices, LISREL 8 in the process of estimations would suggest modification indices for releasing some fixed parameters in order to decrease chi-square for improvement of model fit. Nonetheless, any change in causal relationships among variables will only be in the instances that are theoretically justified. The model fit to data will be evaluated by several model fit measures. Since there appeared to be not much significant difference in the means and standard deviations of the self-perceptions between the first year and third year students, structural modelling was not tested separately for the two-year groups.

Results

As mentioned in the Methodology section, two models were specified for structural equation analysis. The covariance analysis for the non-recursive model failed to converge after a series of attempts by LISREL 8 (Jöreskog & Sörbom, 1993b). This indicated that the model did not adequately fit the data, and thus such a structural relationship was not feasible. On the other hand, the estimations for the recursive model (see Figure 2) demonstrated a convergence after 37 iterations on the data, leading to satisfactory indications of model evaluation. The chi-square was non-significant (103.5; p=.97) with 132 degrees of freedom. The other

goodness-of-fit indices also showed support for the model fit (p-value with RMSEA< .05= 1.00; RMR= .034; GFI= .99; NFI= .99; CFI= 1.00; IFI= 1.00; RFI= .99; Critical N= 702.97).

As regards the measurement model (see Appendix 3), the latent variables TABILITY (Adequacy of Student Teaching Abilities), CLASSMAN (Class Discipline and Management), HUS2 (Humanism), TES2 (Teaching Efficacy), TPRS2 (Teacher-Pupil Relationships), CTS2 (Teaching Commitment), GPS2 (Global Professional Self-Esteem), and RSC2 (Rosenberg's Self-Esteem) explained a high proportion of the variance of their two respective observed variables with similar sizes of standardised coefficients, ranging from .71 (relating CTS22 to CTS2) to .95 (relating TES22 to TES2). The other latent variables PUPACH (Pupil Learning Achievement), PUPSTAND (Pupil Academic Standards), PLANS (Usefulness of Writing Lesson Plans for Teaching), and METHEVAL (Teaching Performance evaluated by Methodology Supervisors) explained a lesser amount of the variance of their respective observable, each of which was just a one-item measure. The standardised coefficients of these variables ranged from .55 to .69.

The effects of the teaching practice experiences on the self-constructs and the structural relationships among the self-constructs were represented by a path diagram (see Figure 2). Initial inspection of the correlations among the latent variables (see Appendix 1) suggested that the five endogenous self-variables TES2, TPRS2, CTS2, GPS2, and RSC2 tended to have a high relationship among themselves and with the exogenous variables TABILITY, CLASSMAN, METHEVAL, and HUS2, but a much lower relationship with the other exogenous variables PUPACH, PUPSTAND, and PLANS. There was a very high relationship between TPRS2 and CTS2, and these two variables also had a similarly high

relationship with HUS2. The covariance matrix of the exogenous latent variables (Φ) is shown in Appendix 2.

There were some modifications of the initial model specifications, as suggested by the modification indices and non-significance of parameters. In Figure 2, the causal effects are expressed in standardised coefficients, whereas their significance testing for the effects, based on the original metric of the measures, are shown in Appendices 4 and 5. The subsequent results indicated that nearly all coefficients were significant at a probability level of less than .05, except the effects of PUPACH on CTS2 and PLANS on GPS2. The latter two non-significant effects were retained in order that model convergence to the data could be ensured. On the whole, the respective causal effects of TES2, GPS2 and RSC2 explained about 60% of the individual variance of these variables, whereas those effects of TPRS2 and CTS2 about 90% of the respective variable variance.

The main points which emerged from further analyses were (1) the impact of professional self-esteem on general self-esteem; (2) the differential effects of the professional self-conceptions of teaching efficacy, teacher-pupil relationships and teaching commitment on professional self-esteem and general self-esteem; (3) the causal relationships among the cluster of professional self-perceptions; and (4) the differential effects of teaching practice experiences and humanism on professional self-esteem and general self-esteem.

Figure 2 The impact of teaching practice on self-perceptions (A structural equation analysis)

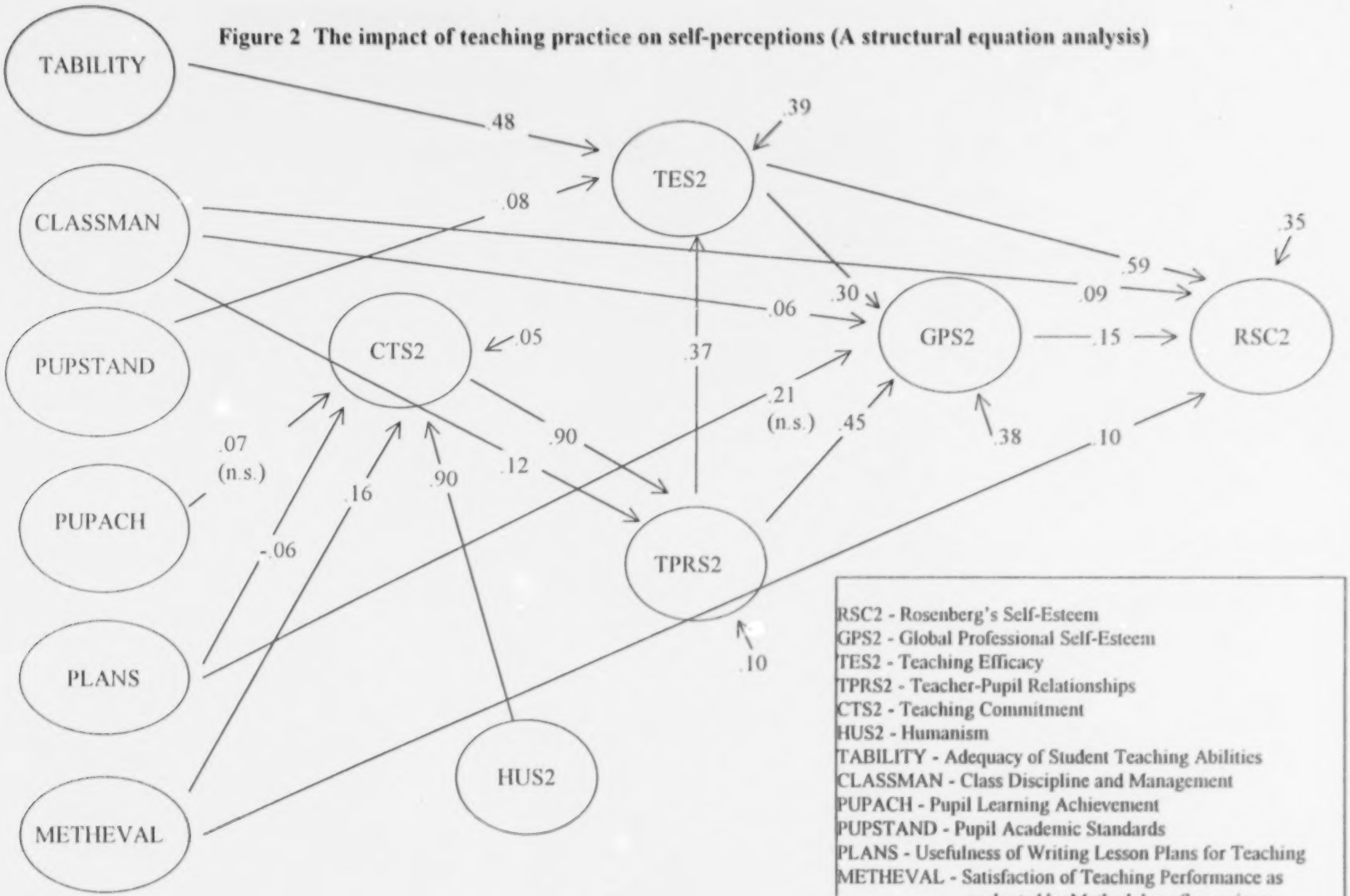


Table 1 Coefficient estimates and significance testing based on original metric (Covariance analysis)

Dependent endogenous latent variables	Relating to independent endogenous latent variables					Relating to exogenous latent variables							Structural disturbances	R^2
	TES2	TPRS2	CTS2	GPS2	RSC2	TABILITY	CLASSMAN	PUPACH	PUPSTAND	PLANS	METHEVAL	HUS2		
TES2	-	.50* (8.25)	-	-	-	.49* (7.83)	-	-	.11* (1.25)	-	-	-	.34* (7.31)	.61
TPRS2	-	-	.74* (15.55)	-	-	-	.12* (2.14)	-	-	-	-	-	.05* (1.47)	.90
CTS2	-	-	-	-	-	-	-	.04 (1.11)	-	.09* (1.59)	.23* (1.08)	.96* (8.49)	.03* (.65)	.95
GPS2	.29* (4.68)	.60* (6.79)	-	-	-	-	.07* (1.02)	-	-	.35 (1.25)	-	-	.31* (5.16)	.62
RSC2	.53* (7.28)	-	-	.14* (2.13)	-	-	.11* (1.52)	-	-	-	.15* (1.00)	-	.25* (4.77)	.65

TES2- Teaching Efficacy
TPRS2 - Teacher-Pupil Relationships
CTS2 - Teaching Commitment
GPS2 - Global Professional Self-Esteem
RSC2 - Rosenberg's Self-Esteem

TABILITY - Adequacy of Student Teaching Abilities
CLASSMAN - Class Discipline and Management
PUPACH - Pupil Learning Achievement
PUPSTAND - Pupil Academic Standards
PLANS - Usefulness of Writing Lesson Plans for Teaching
METHEVAL - Satisfaction of Teaching Performance as evaluated by Methodology Supervisors

( ) - t-ratios
* $p < .05$
R^2 - Squared multiple correlations of dependent endogenous latent variables

Table 2 Standardised effects among endogenous latent variables

Independent latent variables	Effects	Dependent endogenous latent variables				
		TES2	TPRS2	CTS2	GPS2	RSC2
TES2	Total	-	-	-	.30	.64
	Indirect	-	-	-	-	.05
TPRS2	Total	.37	-	-	.56	.30
	Indirect	-	-	-	.11	.30
CTS2	Total	.33	.90	-	.51	.27
	Indirect	.33	-	-	.51	.27
GPS2	Total	-	-	-	-	.15
	Indirect	-	-	-	-	-
RSC2	Total	-	-	-	-	-
	Indirect	-	-	-	-	-

Table 3 Standardised effects of exogenous latent variables on endogenous latent variables

Exogenous latent variables	Effects	Endogenous latent variables				
		TES2	TPRS2	CTS2	GPS2	RSC2
TABILITY	Total	.48	-	-	.14	.31
	Indirect	-	-	-	.14	.31
CLASSMAN	Total	.04	.12	-	.12	.13
	Indirect	.04	-	-	.06	.04
PUPACH	Total	.02	.06	.07	.04	.02
	Indirect	.02	.06	-	.04	.02
PUPSTAND	Total	.08	-	-	.02	.05
	Indirect	-	-	-	.02	.05
PLANS	Total	-.02	-.05	-.06	.18	.02
	Indirect	-.02	-.05	-	-.03	.02
METHEVAL	Total	.05	.15	.16	.08	.14
	Indirect	.05	.15	-	.08	.04
HUS2	Total	.30	.81	.90	.46	.24
	Indirect	.30	.81	-	.46	.24

Endogenous latent variables:

TES2- Teaching Efficacy
TPRS2 - Teacher-Pupil Relationships
CTS2 - Teaching Commitment
GPS2 - Global Professional Self-Esteem
RSC2 - Rosenberg's Self-Esteem

Exogenous latent variables:

TABILITY - Adequacy of Student Teaching Abilities
CLASSMAN - Class Discipline and Management
PUPACH - Pupil Learning Achievement
PUPSTAND - Pupil Academic Standards
PLANS - Usefulness of Writing Lesson Plans for Teaching
METHEVAL - Satisfaction of Teaching Performance as evaluated by Methodology Supervisors

As shown in Figure 2, the development of the student teachers' personal self-esteem (RSC2) was directly affected by another two self-constructs, global professional self-esteem (GPS2) and teaching efficacy (TES2), and two teaching practice experiences, management of class discipline and learning (CLASSMAN) and teaching performance evaluation by methodology supervisors (METHEVAL), with TES2 having the strongest effect (β= .59) and the other three variables influencing it to a lesser extent (β of GPS2= .15; γ of CLASSMAN= .09; γ of METHEVAL= .10). The four variables explained 65% of the variance of RSC2 (see Table 1). RSC2 was subject to a considerable amount of indirect effects from teacher-pupil relationships (TPRS2) through TES2 and GPS2, teaching commitment (CTS2) through TPRS2, TES2 and GPS2, adequacy of teaching abilities (TABILITY) through TES2 and GPS2, and humanistic attitudes (HUS2) through CTS2, TPRS2, TES2 and GPS2 (see Tables 2 & 3). These indirect effects were significant (see Appendices 4 & 5) and even stronger than the direct effects of GPS2, CLASSMAN and METHEVAL, but weaker than the direct effect of TES2.

The student teachers' professional self-esteem (GPS2) derived direct effects mainly from TES2 (β= .30) and TPRS2 (β= .45). The direct influence of the management of class discipline and learning (CLASSMAN) and the usefulness of writing lesson plans for teaching (PLANS) on GPS2 appeared to be insubstantial. The effect of CLASSMAN was significant but weak (γ= .06), while that of PLANS was fairly strong (γ= .21) but insignificant. The four direct effects explained 62% of the variance of GPS2 (see Table 1). The indirect effects on GPS2 were predominantly accounted for by CTS2 (through TPRS2 & TES2) and HUS2 (through CTS2, TPRS2 & TES2) and were contributed to a lesser extent by TPRS2 and

TABILITY through TES2 (see Tables 2 & 3). All these indirect effects were significant (see Appendices 4 & 5).

The student teachers' sense of teaching efficacy (TES2) was strongly influenced by their perceived relationships with pupils (TPRS2; β= .37) and adequacy of teaching abilities (TABILITY; γ= .48). Their pupils' academic standards (PUPSTAND) appeared to pose a significant but rather weak direct impact (γ= .08) on the sense of efficacy (see Figure 2 and Table 1). These direct effects explained 61% of the variance of TES2. On the other hand, the indirect effects on TES2 were mainly derived from CTS2 (through TPRS2) and HUS2 (through CTS2 and TPRS2), (see Tables 2 & 3). These two effects were significant (see Appendices 4 & 5).

The perception of teacher-pupil relationships (TPRS2) was developed through the student teachers' commitment to teaching (CTS2; β= .90) and the management of class discipline and learning (CLASSMAN; γ= .12). These two direct effects explained 90% of the variance of TPRS2 (see Figure 2 & Table 1). TPRS2 derived significant indirect effect from HUS2 through CTS2 (see Table 3 & Appendix 4).

The student teachers acquired their sense of teaching commitment through their strong belief in humanistic relationship with pupils (HUS2; γ= .90). The methodology supervisors' evaluation of their teaching performance (METHEVAL) also positively affected their teaching commitment (γ= .16). The effect of writing lesson plans (PLANS) on the commitment was negative and negligible (γ= -.06), though significant, while that of their

pupils' academic achievement (PUPACH) was also weak but insignificant (γ= .07). The factors explained 95% of the variance of CTS2 (see Figure 2 & Table 1).

Discussion

The data indicated that the multidimensional self-perceptions of the student teachers were hierarchically organised into four levels of causal relationships, with the personal self-esteem at the apex on the farthest right of the path diagram, the professional self-esteem at the next level, then the perceptions of teaching efficacy, teacher-pupil-relationships and teaching commitment mediated the relationships between the teaching practice experiences and the two senses of self-worth. It was a state of self-organisation at the end of the teaching practice. Compared with the self of the student teachers at the beginning of teaching practice, the endogenous self-perceptions of this model increased to become more positive subsequent to the practice (Yeung, 1997). The structure is hierarchical in that the causal relationships tended to move towards a higher level of perceptions, but not in a reverse direction. This model supported the hierarchical features of self-concept as reported in studies (Byrne & Shavelson, 1986, 1987, 1996; Fleming & Courtney, 1984; Marsh & O'Neill, 1984; Shavelson, Hubner & Stanton, 1976).

It appears that the hierarchical structure was organised according to an inclusive principle in the way that a self-schema at a high level, subsuming self-schemata at a lower level, revealed some overall evaluative feelings in response to the effects of each individual schema which it embraced. On the contrary, if a self-schema at a high level influenced any individual subordinate schema within its set, its overall feelings or perceptions would be very likely to spread through its subdivided self-schemata. Accordingly, the student teachers'

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personal self-esteem subsumed all sort of important life events, of which their professional self-perceptions and teaching experiences were among the influential sources that constituted the overall sense of personal worth. That personal sense of confidence and worth diffused over the sense of confidence and worth in performing the role as a teacher. Similarly, the students' own belief in their teaching efficacy, teacher-pupil relationships, and teaching commitment as well as the way they perceived their teaching practice experiences were among sources that contributed to the development of professional self-esteem, which was an overall sense of suitability and worth as a teacher. Hence, the professional self-esteem bore an overall representation of the beliefs and perceptions. The constructs of teaching efficacy, teacher-pupil relationships, and teaching commitment, though conceptually independent of another, were inter-related within a network, which was subject to the influence of the practice experiences.

As indicated in the hierarchical structure, there were differences in the sources of direct effects on the development of self-perceptions between personal self-esteem and professional self-esteem. And the experiences of the student teachers were organised into a personal identity and professional identities (Markus, 1977; Wiley & Alexander, 1987). As such, the two senses of self-worth should be differentiated in order to ascertain variations in the development of self-conceptions of student teachers in terms of personal and professional aspects. This important consideration has often been overlooked in the studies of student teacher self-concept. Making use of a general self-concept, such as the Tennessee Self-Concept Scale (Fitts, 1965), will certainly undermine observations that are specifically related to professional aspects.

The development of the student teachers' professional self-esteem was mainly subject to the direct influence of the belief in their own teaching efficacy and teacher-pupil relationships, and to a much lesser extent the direct influence of the class management and discipline situations that the students experienced during the practice. In other words, the way that the students perceived their suitability and worth as a teacher was dependent on confidence in teaching and building up relationships with pupils. Their sense of teaching commitment only posed a rather strong indirect effect, which was diffused through the sense of efficacy and teacher-pupil relationships, on their professional self-esteem. Hence, a responsible and committed attitude towards teaching alone might not be conducive to the development of professional self-esteem, but it was implied in the beliefs relating the sense of teaching efficacy and teacher-pupil relationships. That is, a teacher who has confidence in teaching and a good teacher-pupil relationship assumes a sense of commitment to teaching. Except that the class discipline and management of learning having a weak direct and indirect effect on professional self-esteem, those perceptions of student teaching experiences which included adequacy of teaching abilities, writing lesson plans, and the evaluations of methodology supervisors only caused a slight indirect influence, variably imbedded in the beliefs relating to teaching commitment, teaching efficacy, and teacher-pupil relationships, on the professional sense of self-worth. Thus, the above just mentioned teaching experiences were adequately organised into and represented in levels of self-perceptions lower than the professional self-esteem, but a small portion of the class discipline and management experience could be differentiated, in addition to its indirect effects, to account for the overall feelings of professional suitability and sense of worth.

The development of the student teachers' personal self-esteem was strongly affected by their sense of teaching efficacy but only slightly influenced by their professional self-

esteem, the situations of class discipline and management, and the evaluations of methodology practice supervisors. Hence, some aspects of teaching abilities and classroom teaching and learning were founded on a personal basis. Concerning the methodology supervisors, the possible indications of their evaluative effectiveness, though weak, resulting in direct enhancement of the students' teaching commitment and personal confidence is encouraging. However, a lack of direct impact of the supervisors' role on the sense of efficacy warrants a concern. Maybe, the supervisors' focus of providing guidance in general teaching methods was very much likely to be ineffectual in helping the student teachers to improve pedagogical skills and classroom learning (Mansfield, 1986; Proctor, 1993). Among the student teaching experiences, the student teachers' perceived teaching abilities imposed a strong indirect impact on the development of their personal self-esteem, whereas the other experiences that were associated with class discipline and management, pupil academic standards, writing lesson plans, and the evaluations of methodology supervisors exerted a weak indirect effect on the sense of self-worth. These indirect effects, which were similar to those found in the relationships with the professional self-esteem, were diffused one way or another through the professional self-perceptions.

The development of the sense of teaching efficacy was strongly affected by the student teachers' perceptions of teacher-pupil relationships and adequacy of student teaching abilities, and weakly by their perceived pupil academic standards. The perceived pupil academic achievement only bore a weak indirect effect, through the sense of teaching commitment and teacher-pupil relationships, on the teaching efficacy. In other words, there was a very weak relationship between the students' perceived pupil achievement in learning and confidence in teaching, and if any, the relationship would be expressed through professional fulfilment and a teacher-pupil relationship. Moreover, the sense of efficacy was

also affected by the perceptions of class discipline and management of learning through their belief in teacher-pupil relationships. It appears to suggest that class discipline and a learning atmosphere were significant for developing teacher-pupil relationships, which in turn facilitated the development of teaching efficacy.

The student teachers' sense of teaching commitment imposed a very strong direct effect on their belief in teacher-pupil relationships, and also a fairly strong indirect influence on their development of personal self-esteem, professional self-esteem, and teaching efficacy. Hence, a work commitment to teaching played a significant role in the student teachers' professional development (Evans & Tribble, 1986). Interestingly, the sense of commitment was subject to a very strong influence from the students' belief in humanism. As a teacher educator, we should be glad to see that significant relationship, and subsequently we become assured in professing educational philosophy in relation to humanistic teacher-pupil relationships. As mentioned early, the evaluative function of methodology supervisors played some role in the development of the sense of commitment. Concerning the preparation of lesson plans, it was unlikely that the task would contribute any promising effect on the development of the sense of commitment and even the other professional self-perceptions. As student teachers spend quite a lot of time and effort in doing the task, its is sensible of them to realise the grounds for writing lesson plans, particularly relating to instructional planning and evaluation.

From the above covariance analyses, we may conclude that the development of the student teachers' professional self-esteem was dependent on the manner that the students perceived their efficacy in teaching, teacher-pupil relationships, and sense of commitment to teaching. Except for the students' self-perceived adequacy of teaching abilities, the impact of

the other teaching practice experiences, which were observed in this model, on the development was fairly limited. This may partly be due to the fact that the variables of pupil achievement in learning, pupil academic standards, writing lesson plans, and the evaluations of methodology supervisors involved a considerable amount of measurement errors as each of them was only related to a single-item direct measure. Due to the limitation of the sample size of this quantitative study, it is a pity that a number of interesting observations could not be made in this covariance analysis, such as the differences in structure of self-perceptions between the first year and third year students, the relative strength of causal effects between pupil control and humanism, and the differential effects between the guidance of elective and methodology supervisors.

As far as this research is concerned, there are a number of implications as to what should be observed in a teacher education programme, particularly in the context of Hong Kong, in promoting training effectiveness. No doubt, pedagogical processes that involve preparing student teachers for adequacy of instructional knowledge and skills and for a positive attitude towards good teacher-pupil relationships are among key elements a teacher education curriculum entails. In respective of instructional effectiveness, this study showed that the student teachers' own views on their teaching performance, as their development of teaching efficacy suggested, appeared to be predominantly based on the extent to which they had successfully fulfilled teaching tasks and activities rather than on learning achievement of school children. As such, novice teachers in the course of any teacher education should be well acknowledged that pupil learning outcomes are on a par with concern for performance of instructional skills and carrying through duties. As regards teacher-pupil relationships, a strong sense of professional commitment and humanism, in accordance with this study, definitely contributed to the development of satisfactory relations between teacher and pupil,

and hence to teaching efficacy and professional self-esteem. Thus, any programme or course of study that promotes the development of the attitudes should occupy a significant position in teacher education. It is hoped that they manage to ground student teachers well in positive ways of relating to pupils and that with humanistic education, the novices hold their ground in the face of possible custodial rituals of the school during teaching practice.

However, as the sense of efficacy was strongly founded on the self-belief in teacher-pupil relationships and adequacy of teaching abilities, it would not be uncommon to find that student teachers easily confound relationships with instructional abilities proper. There is thus a need for them to realise that a good relationship with pupils only serves the purpose of facilitating instructional progression, and that the roles of instructional efforts and pupils' learning achievement are also germane to professional efficacy.

As discussed earlier, a lack of the methodology supervisors' direct impact on the development of the student teachers' sense of efficacy was really a concern. Perhaps, we are by no means surprised at a similar situation prevailing in the teacher education field as a whole in which college lecturers are not well prepared for teaching practice supervision (Mansfield, 1986; McIntyre, 1984; Meade, 1991; Proctor, 1993). Therefore, this calls for involving college lecturers in undergoing proper supervisory training before they are allowed to undertake supervision. The training may involve enhancing their existing knowledge at least in the areas of educational theories, teaching methodology, psychology of learning, integration of theories into practice, and proper supervisory procedures. In the process of delivering supervision, it is sensible to realise that if any suggestions and comments from the supervisors are to become part of student teachers' core belief structure of competence, those teaching approaches and strategies as suggested by them have to commend themselves

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to the students, in the manner that they possess the effects of rectifying instructional problems and improving teaching performance. To further substantiate the achievement of these supervisory objectives, research into student teaching and learning of pupils has to be encouraged in order to obtain findings to clarify what constitute effective teaching in local situations.

Conclusions

This research suggested that the student teachers' self-perceptions were hierarchically organised according to an inclusive principle. Their personal self-esteem and professional self-esteem were different from another as they were subject to different sources of influence. The development of professional self-esteem was basically contingent upon the influence of teaching efficacy, teacher-pupil relationships, and teaching commitment. It in turn affected the organisation of personal self-esteem. The student teachers' humanistic beliefs and perceptions of their adequacy of teaching abilities overwhelmingly influenced the organisation of the self-structure. Other teaching practice experiences within the model posed a fairly weak effect on the structural organisation of the self. They included class discipline and management, pupil learning achievement, pupil academic standards, usefulness of writing lesson plans for teaching, and methodology supervisors' evaluation of teaching practice performance. Of course, the present hierarchical model may be a model among possibly feasible models that would be extracted from the data. The existence of other models will vary according to different theoretical focus. This lends support to the idea that a state of selectivity and flexibility characterises cognitive processing.

The present findings indicated that the self-variables of teacher-pupil relationships and teaching efficacy posed strong direct influence on professional self-esteem. Thus, they can be considered as direct measures for professional self-esteem, which is then purely treated as a latent variable in measurement. Those original items of professional self-esteem, developed by this study, can be released from the item pool of a study. This consideration may help reduce the chance of collinearity among variables as well as increase direct measure spaces for other observations.

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Appendix 1 Correlations of endogenous latent variables and exogenous latent variables (As a result of covariance analysis)

Variables	TES2	TPRS2	CTS2	GPS2	RSC2	TABILITY	CLASSMAN	PUPACH	PUPSTAND	PLANS	METHEVAL	HUS2
TES2	1.00											
TPRS2	.67	1.00										
CTS2	.65	.95	1.00									
GPS2	.66	.72	.69	1.00								
RSC2	.78	.60	.57	.62	1.00							
TABILITY	.72	.60	.60	.54	.61	1.00						
CLASSMAN	.48	.49	.42	.45	.49	.53	1.00					
PUPACH	.29	.27	.26	.27	.25	.34	.34	1.00				
PUPSTAND	.27	.25	.20	.18	.24	.21	.61	.35	1.00			
PLANS	.11	.20	.21	.34	.17	.11	.15	.22	-.22	1.00		
METHEVAL	.49	.49	.48	.49	.51	.63	.54	.11	.02	.42	1.00	
HUS2	.60	.90	.96	.65	.52	.53	.35	.20	.18	.20	.37	1.00

Endogenous latent variables:

TES2 - Teaching Efficacy
TPRS2 - Teacher-Pupil Relationships
CTS2 - Teaching Commitment
GPS2 - Global Professional Self-esteem
RSC2 - Rosenberg's Self-Esteem

Exogenous latent variables:

TABILITY - Adequacy of Student Teaching Abilities
CLASSMAN - Class Discipline and Management
PUPACH - Pupil Learning Achievement
PUPSTAND - Pupil Academic Standards
PLANS - Usefulness of Writing Lesson Plans for Teaching
METHEVAL - Satisfaction of Teaching Performance as evaluated by Methodology Supervisors
HUS2 - Humanism

Appendix 2 Covariance matrix of exogenous latent variables (Φ)

Exogenous latent variables	TABILITY	CLASSMAN	PUPACH	PUPSTAND	PLANS	METHEVAL	HUS2
TABILITY	.83 (13.95)						
CLASSMAN	.33* (15.23)	.46 (11.99)					
PUPACH	.48* (14.12)	.35* (12.50)	.42 (.32)				
PUPSTAND	.13* (3.82)	.28* (10.02)	.38* (8.00)	.48 (.97)			
PLANS	.06* (1.79)	.06* (2.00)	.19 (3.19)	-.08 (-1.68)	.30 (1.12)		
METHEVAL	.33* (10.01)	.21* (7.44)	.10 (2.03)	.01 (.14)	.13 (2.76)	.33 (1.53)	
HUS2	.38* (16.28)	.19* (11.63)	.24* (7.42)	.10* (2.72)	.09* (2.42)	.17* (5.22)	.61 (11.59)

TABILITY - Adequacy of Student Teaching Abilities
CLASSMAN - Class Discipline and Management
PUPACH - Pupil Learning Achievement
PUPSTAND - Pupil Academic Standards
PLANS - Usefulness of Writing Lesson Plans for Teaching
METHEVAL - Satisfaction of Teaching Performance as evaluated by Methodology Supervisors
HUS2 - Humanism

( ) - t-ratios
* $p < .05$

Appendix 3 Standardized coefficients relating observed variables to latent variables

Observed variables	Independent latent variables	Standardized coefficients	Measurement errors
Observables regressing on exogenous latent variables			
TAB1	TABILITY	.91	.17
TAB2		.90	.19
CLA1	CLASSMAN	.88	.23
CLA2		.84	
III2	PUPACH	.55	.63
III9	PUPSTAND	.69	.52
III3.1	PLANS	.55	.70
III4b	METHEVAL	.58	.67
HUS21	HUS2	.78	.39
HUS22		.79	.37
Observables regressing on endogenous latent variables			
TES21	TES2	.93	.13
TES22		.95	.10
TPRS21	TPRS2	.83	.32
TPRS22		.91	.17
CTS21	CTS2	.84	.30
CTS22		.71	.49
GPS21	GPS2	.91	.17
GPS22		.92	.15
RSC21	RSC2	.84	.29
RSC22		.90	.18

TAB observables - Adequacy of teaching abilities
CLA observables - Class discipline & management
III2 observable - Pupil learning achievement
III9 observable - Pupil academic standards
III3.1 observable - Usefulness of writing lesson plans for teaching
III4b observable - Teaching performance evaluations by methodology supervisors
HUS observables - Humanism attitudes
TES observables - Teaching Efficacy
TPRS observables - Teacher-Pupil Relationships
CTS observables - Teaching Commitment
GPS observables - Global Professional Self-Esteem
RSC observables - Rosenberg's Self-Esteem

Notes:
Each of the observed continuous variables TAB, CLA, HUS,TES,TPRS,CTS, GPS, and RSC consisted half of the items of their respective scale (after teaching practice) for the measurement model of the covariance analysis.

III2, III9, III3.1 and III4b were ordinal observables.

Appendix 4 Effects of exogenous latent variables on endogenous latent variables and their significance testing based on original metric

Exogenous latent variables	Effects	Endogenous latent variables				
		TES2	TPRS2	CTS2	GPS2	RSC2
TABILITY	Total	.49*	-	-	.14*	.28*
		(7.18)			(3.58)	(4.93)
	Indirect	-	-	-	.14*	.28*
					(3.58)	(4.93)
CLASSMAN	Total	.06*	.12*	-	.16*	.16*
		(2.12)	(2.33)		(2.05)	(1.91)
	Indirect	.06*	-	-	.09*	.05*
		(2.12)			(2.23)	(2.38)
PUPACH	Total	.01*	.03	.04	.02	.01*
		(.25)	(.25)	(.25)	(.25)	(.24)
	Indirect	.01*	.03	-	.02	.01*
		(.25)	(.25)		(.25)	(.24)
PUPSTAND	Total	.11*	-	-	.03*	.06*
		(1.36)			(1.34)	(1.35)
	Indirect	-	-	-	.03*	.06*
					(1.34)	(1.35)
PLANS	Total	-.03	-.07	-.09*	.30*	.02*
		(.51)	(.51)	(.51)	(.84)	(.37)
	Indirect	-.03	-.07	-	-.05	.02*
		(.51)	(.51)		(.51)	(.37)
METHEVAL	Total	.09	.17	.23*	.13*	.21*
		(.68)	(.71)	(1.71)	(1.71)	(1.74)
	Indirect	.09	.17	-	.13*	.06*
		(.68)	(.71)		(1.71)	(1.73)
HUS2	Total	.35*	.71*	.96*	.53*	.26*
		(6.06)	(10.47)	(10.92)	(6.41)	(4.65)
	Indirect	.35*	.71*	-	.53*	.26*
		(6.06)	(10.47)		(6.41)	(4.65)

TES2 - Teaching Efficacy
TPRS2 - Teacher-Pupil Relationships
CTS2 - Teaching Commitment
GPS2 - Global Professional Self-Esteem
RSC2 - Rosenberg's Self-Esteem

TABILITY - Adequacy of Student Teaching Abilities
CLASSMAN - Class Discipline and Management
PUPACH - Pupil Learning Achievement
PUPSTAND - Pupil Academic Standards
PLANS - Usefulness of Writing Lesson Plans for Teaching
METHEVAL - Satisfaction of Teaching Performance as evaluated by Methodology Supervisors
HUS2 - Humanism

( ) - t-ratios
* $p < .05$

Appendix 5 Effects among endogenous latent variables and their significance testing based on original metric

Independent latent variables	Effects	Dependent endogenous latent variables				
		TES2	TPRS2	CTS2	GPS2	RSC2
TES2	Total	-	-	-	.29* (4.93)	.57* (8.55)
	Indirect	-	-	-	-	.04* (1.98)
TPRS2	Total	.50* (6.73)	-	-	.74* (8.38)	.37* (5.72)
	Indirect	-	-	-	.15* (4.87)	.37* (5.72)
CTS2	Total	.37* (6.75)	.74* (15.64)	-	.55* (7.99)	.27* (5.59)
	Indirect	.37* (6.75)	-	-	.55* (7.99)	.27* (5.59)
GPS2	Total	-	-	-	-	.14* (2.11)
	Indirect	-	-	-	-	-
RSC2	Total	-	-	-	-	-
	Indirect	-	-	-	-	-

TES2 - Teaching Efficacy
TPRS2 - Teacher-Pupil Relationships
CTS2 - Teaching Commitment
GPS2 - Global Professional Self-Esteem
RSC2 - Rosenberg's Self-Esteem

( ) - t-ratios
* $p < .05$